

Ungulate Herbivory in Aspen Communities



**Paul Rogers, Western Aspen Alliance
& Utah State University**

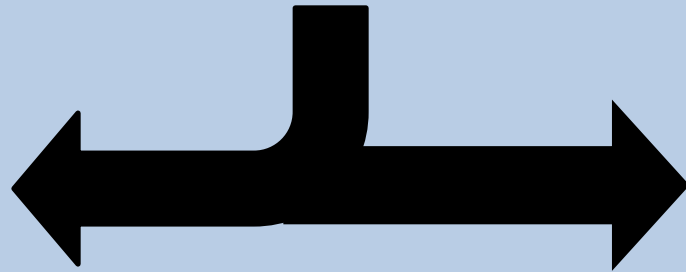
Road Map



1. What's the issue?
2. Ungulates since settlement
3. Documentation methods
4. Response toolbox
5. Key references

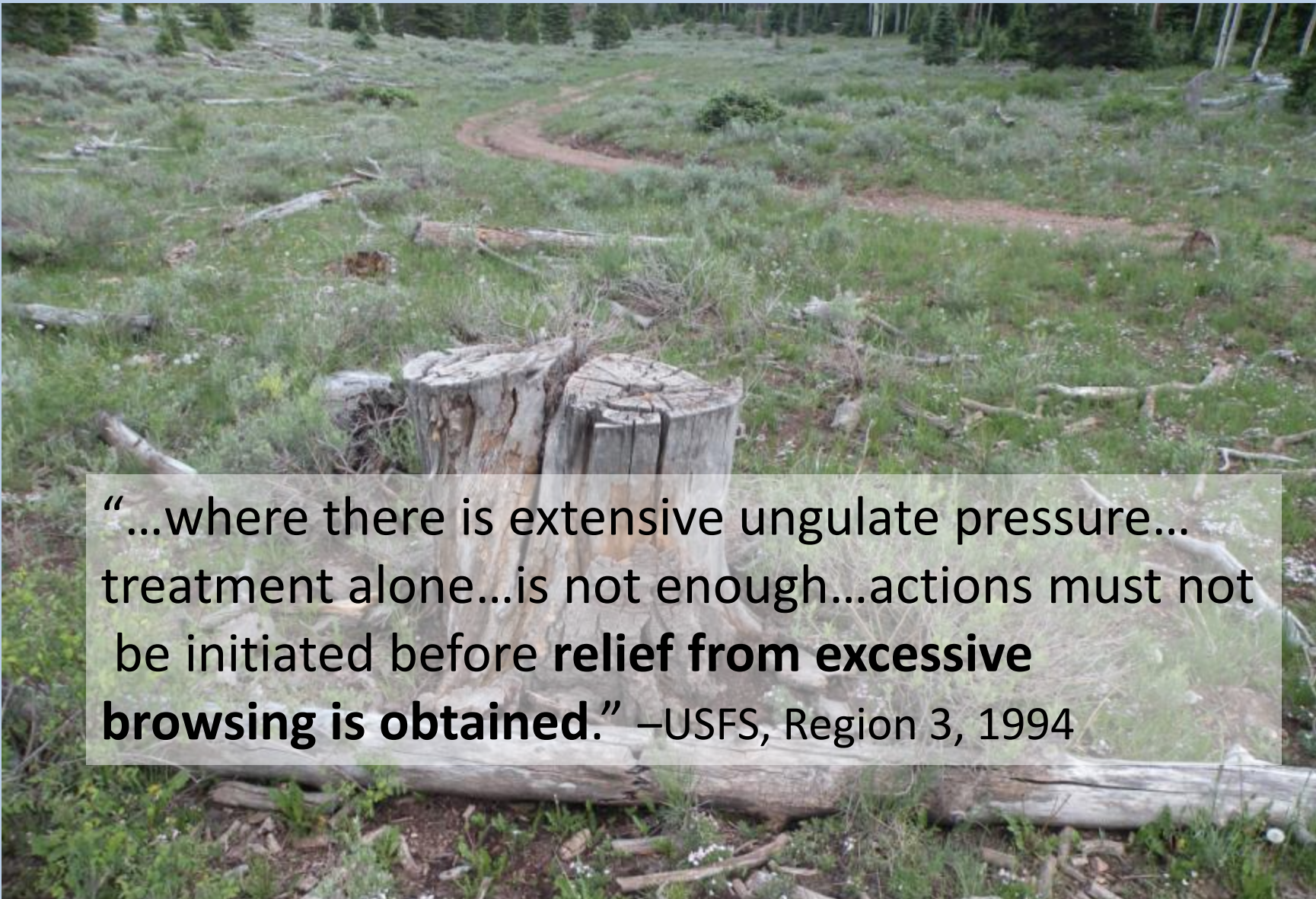
What's the issue?

- Aging regional aspen cohort
- Decreased disturbance
- Management for conifers
- Recent/expected drought
- Insect & disease incidence
- **Unsuccessful recruitment**



Not all aspen are alike

What's the issue?



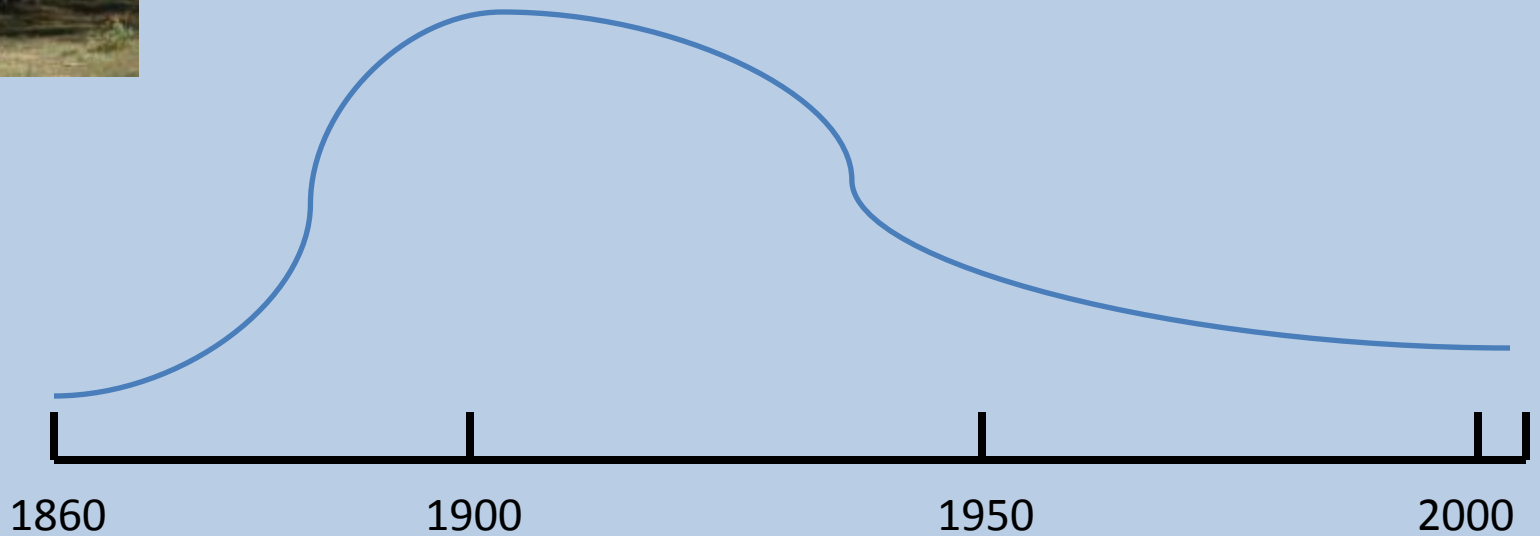
“...where there is extensive ungulate pressure... treatment alone...is not enough...actions must not be initiated before **relief from excessive browsing is obtained.**” –USFS, Region 3, 1994

Ungulates since settlement

(a quick and dirty history)



Sheep

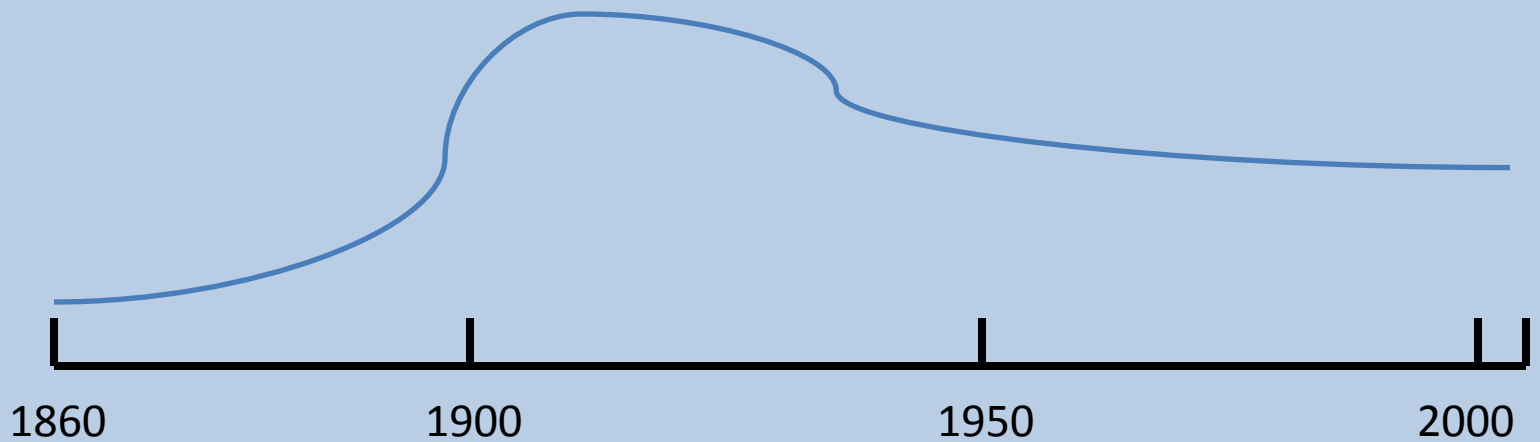


Ungulates since settlement

(a quick and dirty history)



Cattle

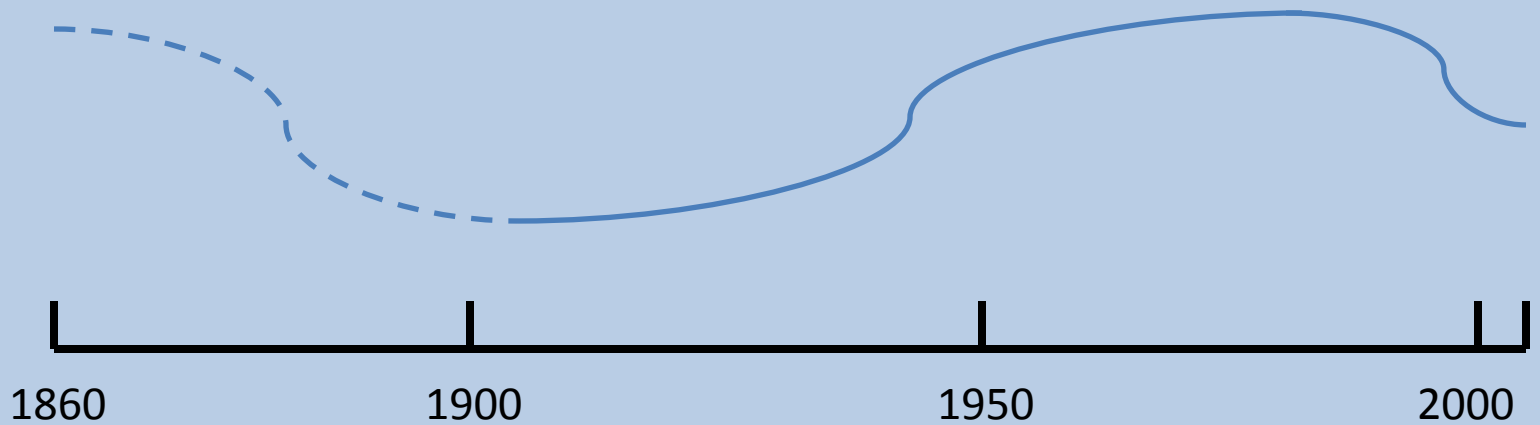


Ungulates since settlement

(a quick and dirty history)



Deer



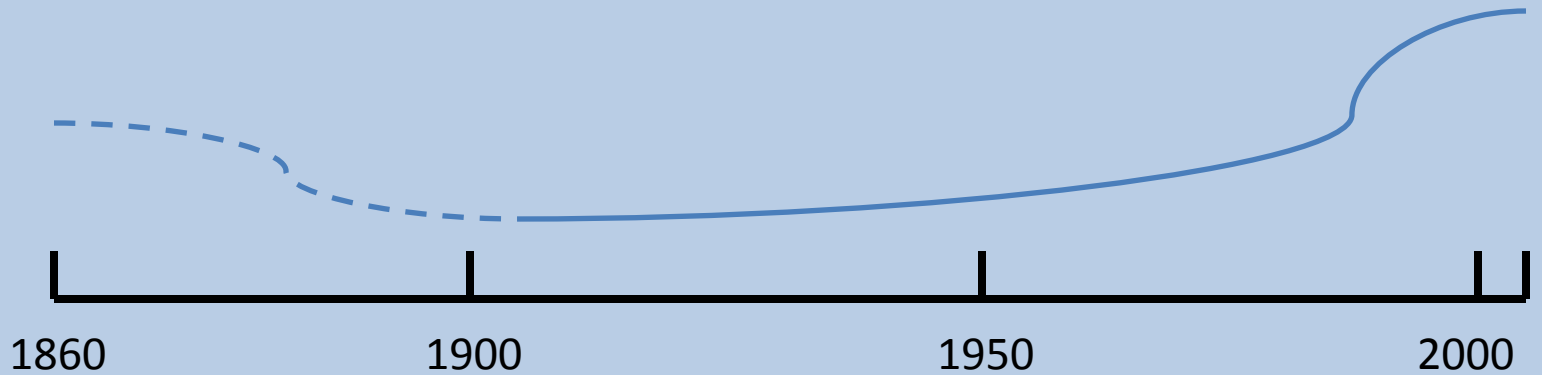
Ungulates since settlement

(a quick and dirty history)



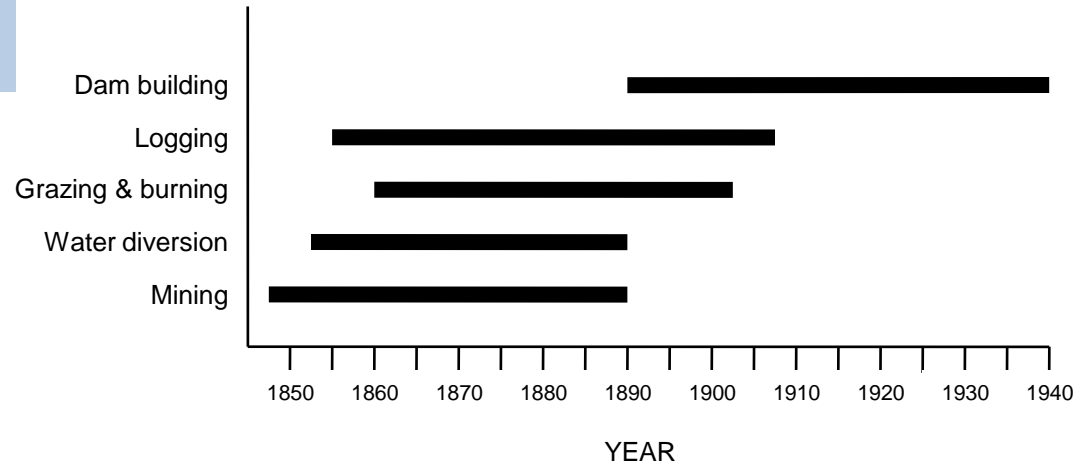
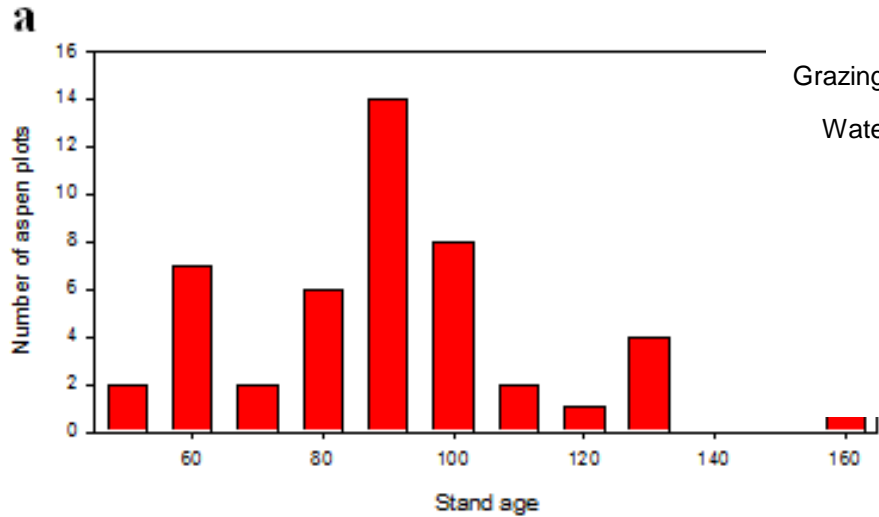
Photo: Jim Schuler

Elk

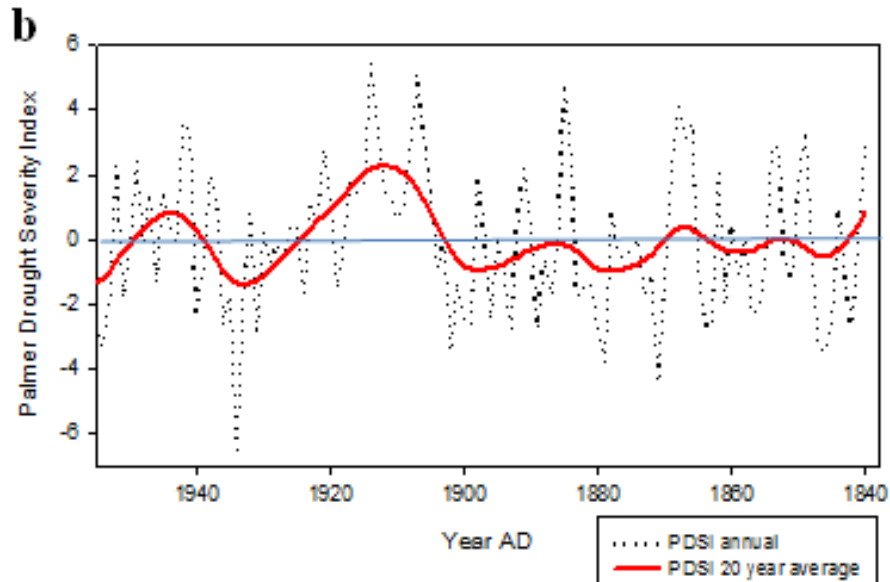


Ungulates since settlement

.....Some Context



Rogers, et al., 2007



Rogers, et al., 2011

Documentation methods

Landscape studies

Natural refugia

Exclosures



Documentation methods

Feces analysis

Motion cameras



Documentation methods

Motion cameras (video)



Documentation methods

UFRWG, 2010

ASPEN REGENERATION AND RECRUITMENT LEVELS

Aspen regeneration levels (suckers < 6 ft. [2 m] height)

>1000/acre	>2500/ha	self-replacing
500-1000/acre	1250-2500/ha	marginal
<500/acre	<1250/ha	not self-replacing (recommend investigation)

Aspen recruitment levels (stems > 6 ft. [2 m] and < canopy height)

<500/acre	<1250/ha	not self-replacing (recommend investigation)
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Mueggler, 1989; Campbell & Bartos, 2001; Kurzel, et al., 2007; Rogers et al., 2010

Landscape studies

Natural refugia

Exclosures

Feces analysis

Motion cameras

- **None are foolproof**
- **Complementary results with multiple methods yields best results**



Response toolbox

In most instances: multi-agency/interdisciplinary

- Alter livestock numbers, movement, seasonality
- Use guard dogs with mobile livestock
- Fencing: situation = size & style
- Enhance alternate forage/browse
- Collaborate with wildlife agency re: numbers
- Wildlife movement: special hunts, predators, other?
- Explore disturbance/scale/browse issues
- Restore natural disturbance regimes, if possible

Overarching focus of ecological process restoration

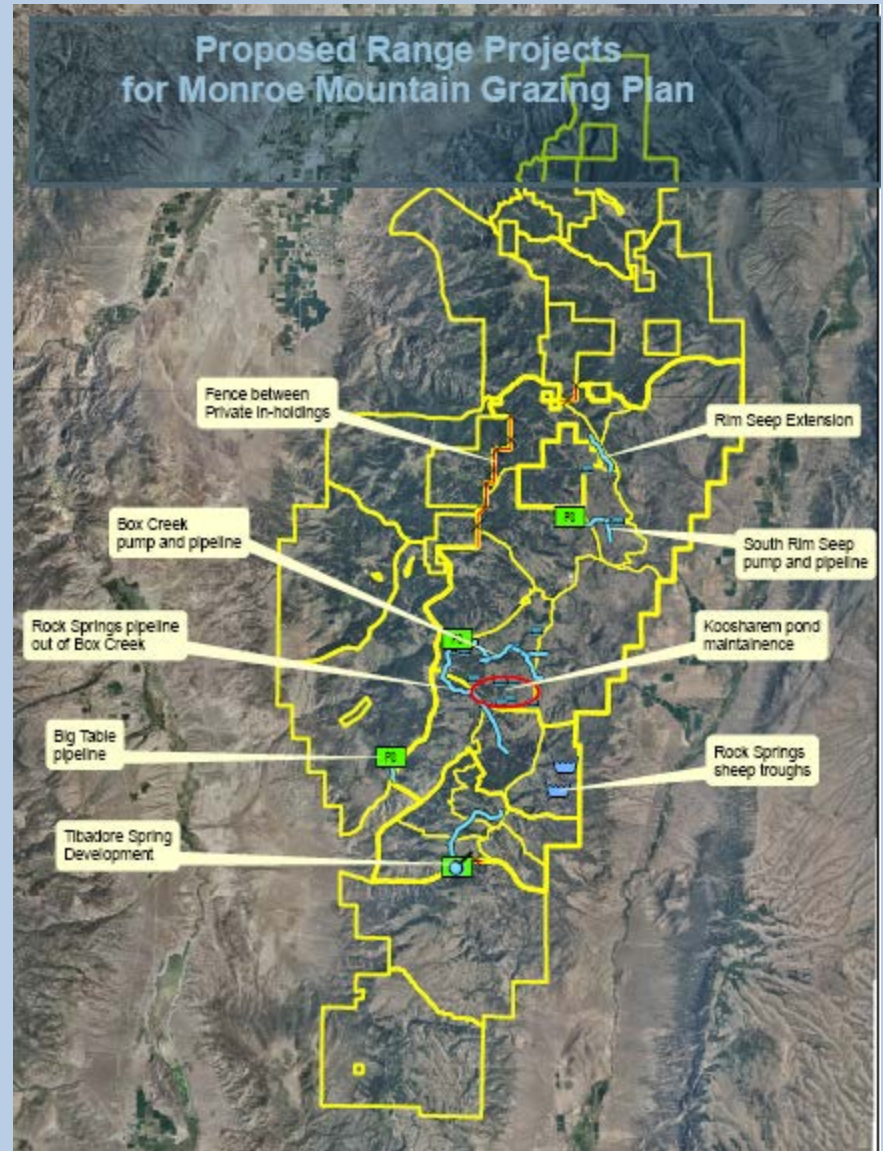
Response toolbox: Examples

Utah Forest Restoration Working Group (UFRWG)



Response toolbox: Examples

- Swap cattle/sheep
- New water additions
- Guard dogs w/sheep



Tom Tippets, UDAF, Grazing Improvement Program

Response toolbox: Examples

VerCauteren, et al., 2007

Fencing



Response toolbox: Examples

Wildlife numbers



Photo: Wayne Shepperd



Response toolbox: Examples

Disturbance: restoration & size



Key references

Cited here:

Campbell, R.B. Jr., Bartos, D.L., 2001. Aspen ecosystems: objectives for sustaining biodiversity. In: Shepperd, W. D., Binkley, D, Bartos, D. L., Stohlgren, T. J., and Eskew, L. G. (eds.). Sustaining aspen in western landscapes: symposium proceedings, Grand Junction, Colorado, USA, June 13-15, 2000. RMRS-P-18, 299-307. Rocky Mountain Research Station, USDA, Forest Service.

Kurzel, B.P., Veblen, T.T., Kulakowski, D., 2007. A typology of stand structure and dynamics of Quaking aspen in northwestern Colorado. *Forest Ecology and Management* 252, 176-190.

Mueggler, W.F., 1989. Age distribution and reproduction of Intermountain aspen stands. *Western Journal of Applied Forestry* 4[2], 41-45.

Rogers, P.C.; Leffler, A.J.; Ryel, R.J. 2010. Landscape assessment of a stable aspen community in southern Utah, USA. *Forest Ecology and Management*, 259(3): 487-495.

Rogers, P.C., Bartos, Dale L., Ryel, Ronald J. 2011. Historical patterns in lichen communities of montane quaking aspen forests. In: Justin A. Daniels (ed.), *Advances in Environmental Research, Vol. 15*. Nova Science Publishers, Hauppauge, NY: pp. 33-64.
https://www.novapublishers.com/catalog/product_info.php?products_id=30532

UFRWG) (Utah Forest Restoration Working Group) - Ecology Committee [Mary O'Brien, Paul C. Rogers, Kevin Mueller, Rob MacWhorter, Allen Rowley, Bill Hopkin, Bill Christensen, Paul Dremann]. 2010. Guidelines for Aspen Restoration on the National Forests in Utah, WesternAspen Alliance, Utah State University, Logan, UT. 48 p. <http://www.western-aspen-alliance.org/>

VerCauteren, Kurt C., Nathan W. Seward, Michael J. Lavelle, Justin W. Fischer, and Gregory E. Phillips (2007) A Fence Design for Excluding Elk Without Impeding Other Wildlife. *Rangeland Ecology & Management*: September 2007, Vol. 60, No. 5, pp. 529-532

Key references

Other ungulate/aspen sources:

Bailey, Joseph K.; Schweitzer, Jennifer A.; Rehill, Brian J.; Irschick, Duncan J.; Whitham, Thomas G., and Lindroth, Richard L. 2007. Rapid shifts in the chemical composition of aspen forests: an introduced herbivore as an agent of natural selection. *Biological Invasions* 9:715-722.

DeRose, R. Justin and Long, James N. 2010. Regeneration response and seedling bank dynamics on a *Dendroctonus rufipennis*-killed *Picea engelmannii* landscape. *Journal of Vegetation Science* 21:377-387.

Hessl, Amy. 2002. Aspen, elk, and fire: the effects of human institutions on ecosystem processes. *Bioscience* 52(11):1011-1021

Jones, B. E., D. F. Lile, and K. W. Tate. 2011. Cattle Selection for Aspen and Meadow Vegetation: Implications for Restoration. *Rangeland Ecology and Management* 64:625-632.

Kay, C. E. and D. L. Bartos. 2000. Ungulate herbivory on Utah aspen: assessment of long-term exclosures. *Journal of Range Management* 53:145-153.

Kota, A.M.; Bartos D.L. 2010. Evaluation of techniques to protect aspen suckers from ungulate browsing in the Black Hills. *West. J. Appl. For.* 25(4):161-168.

Randall, J. A. and M. B. Walters. 2011. Deer density effects on vegetation in aspen forest understories over site productivity and stand age gradients. *Forest Ecology and Management* 261:408-415.

Stritar, Michelle L.; Schweitzer, Jennifer A.; Hart, Stephen C., and Bailey, Joseph K. 2010. Introduced ungulate herbivore alters soil processes after fire. *Biological Invasions* 12:313-324.

Weisberg, P. J.; Hobbs, N. T.; Ellis, J. E., and Coughenour, M. B. 2002. An ecosystem approach to population management of ungulates. *Journal-of-Environmental-Management* 65(2):181-197.

Wooley, Stuart C.; Walker, Scott; Vernon, Jason, and Lindroth, Richard L. 2008. Aspen decline, aspen chemistry, and elk herbivory: are they linked? *Rangelands* 30(1):17-21.

Partners



Utah State University
COOPERATIVE EXTENSION
Utah State University Forestry Extension



National Forest Foundation



USDA Forest Service
Rocky Mountain
Research Station

US Dept of Interior
Bureau of Land
Management



Grand Canyon Trust



ECOLOGY
CENTER

Utah State University
Ecology Center



USDA Forest Service
Region 1: Northern
Region 2: Rocky Mountain
Region 3: Southwestern
Region 4: Intermountain



SUSTAINABLE
FORESTS
PARTNERSHIP

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California Rangeland
Watershed Laboratory



Wyoming Game & Fish
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Poplar Council
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